

Hydatid cyst of gall bladder masquerading as carcinoma: A rare case report with review of literature

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Summary

Hydatid disease is a parasitic infestation caused by *Echinococcus*, most commonly *Echinococcus granulosus*. Liver is the most common location followed by lungs. Hydatid involvement of gall bladder is a very rare entity, which masqueraded as gall bladder cancer. Here, we attempt to highlight the relevance of this rare disease and discuss this unique case of a 60-year-old male, who presented with gall bladder mass, abdominal pain, and vomiting. The patient was eventually diagnosed as Hydatid disease. The patient has been treated on medical management and has shown improvement. The manuscript has discussed diagnosis and management of disease along with review of literature.

Keywords: Hydatid cyst, gall bladder, *Echinococcus*, gall bladder carcinoma

1. Introduction

The 2015 WHO Foodborne Disease Burden Epidemiology Reference Group (FERG) statistics display a whopping 19,300 deaths and around 871,000 disability-adjusted life-years (DALYs) due to echinococcosis globally each year (1). Hydatid disease is a zoonotic disease caused by the larvae of genus *Echinococcus*, most commonly *Echinococcus granulosus* (95%) (2). It is one of the oldest parasitic diseases known to man and is most prevalent among sheep raising Mediterranean countries, Africa, South – America, Middle east, Australia and New Zealand. In India, southern states like, Andhra Pradesh, Saurashtra region of Gujrat, and Tamil Nadu reports highest prevalence of human hydatid disease (3). Humans are an accidental dead host, where liver (70-80%) is

the most common location followed by lungs (15-25%). Liver, being filtering organ for portal vessels, becomes, first probable site for lodging of parasitic ova (4). If parasites are not trapped in either liver or lung or may escape liver *via* lymphatic channels, they may get lodged in any part, like peritoneal cavity (8-18%), spleen (2-3%), kidney (1-4%), uterus and adnexa (0.5-1%), retroperitoneum (0.5-1%), pancreas (0.5-0.8%), brain (2%), gall bladder (< 1%), and others (0.1-3%) (5).

Gall bladder hydatid disease (GBHD) is a very rare entity and can be either primary or secondary to liver hydatid disease. Extensive literature review revealed 32 PubMed indexed and published case reports of GBHD (2,5-16). Here, we describe a case of GBHD along with involved liver suspected as GB malignancy with liver secondaries.

2. Case Report

A 60-year male, laborer by profession and non-vegetarian by diet presented with the complaints of abdominal pain associated with anorexia and weight loss for 1 year to Surgical OPD of All India Institute of Medical Sciences, New Delhi in January 2018. General physical examination and abdominal examination

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were within normal limits. Routine biochemical and hematological investigations were also within normal limits. Ultrasound (USG) abdomen (Figures 1A-1C) revealed a 4 × 3 cm mass in the gall bladder along with hypo-echoic lesion in segment IV A, segment I, segment VII & VIII of liver. Abdomen MRI (Figure 1D) further showed similar lesion in gall bladder. An impression of gall bladder carcinoma with metastasis to liver was proposed on imaging and guided Fine needle aspiration cytology (FNAC) was advised.

Guided aspirate smears from liver lesion showed very scant cellularity. It showed few fragments of lamellar tegument from cyst wall. There were scattered parasitic hooklets and calcareous corpuscles in a necro-inflammatory background. Features were consistent with *Echinococcus granulosus* (Hydatid cyst). In second setting, FNAC from gall bladder mass was done to rule out malignancy. GB mass fine needle aspiration

smears also yielded similar findings to that of liver aspirate (Figures 1E and 1F). Subsequently, hydatid serology was found to be positive. Patient was started on Albendazole tablet 400 mg BD for 4 weeks followed by a 2-week treatment free interval cycle in 3 cycles for 3 months. Patient was then advised for pericystectomy and cholecystectomy but, he denied any surgical intervention. Patient is on regular follow-up for the past year. Routine biochemical parameters were within normal limits and patient is symptomatically better with no nausea, vomiting or abdominal pain. After 3 months of treatment, USG abdomen and Hydatid serology levels were repeated. USG revealed a normally distended gall bladder without any mass lesion (Figure 2B), however a 2.5 × 2.4 cm hypo-echoic lesion with internal membranes and calcific foci was noted in segment VIII of liver (Figure 2A) suggesting residual disease.

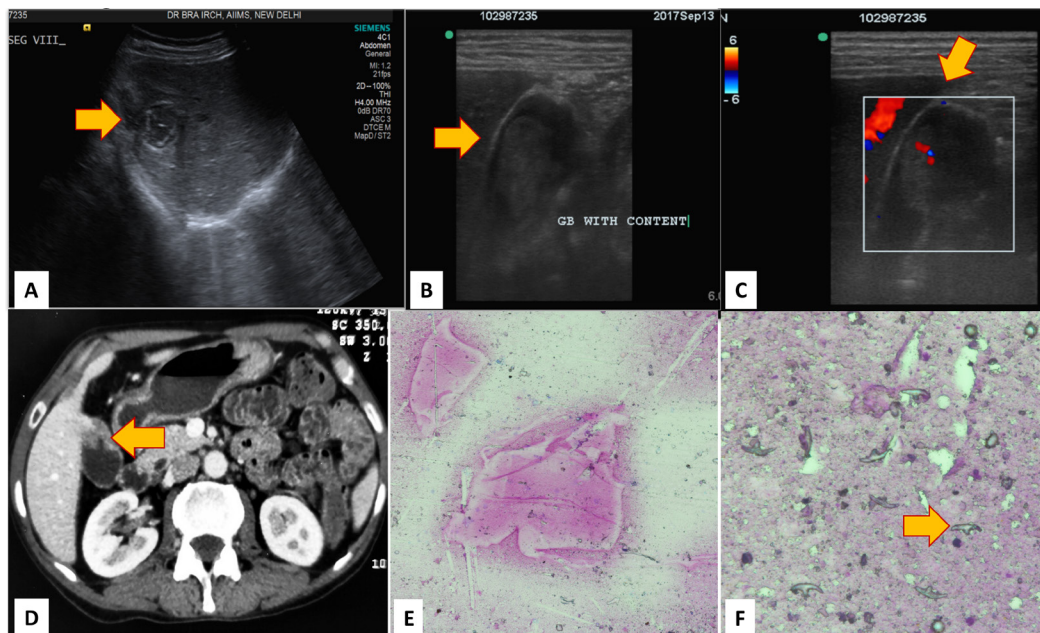


Figure 1. (A) Hydatid cyst in segment VIII of liver, (B) GB mass with content mimicking malignancy, (C) with absolute nil vascular flow, (D) Liver hydatid with the typical water lily sign, (E) FNAC from GB showing laminated membranes, and (F) multiple hooklets with hydatid sand.

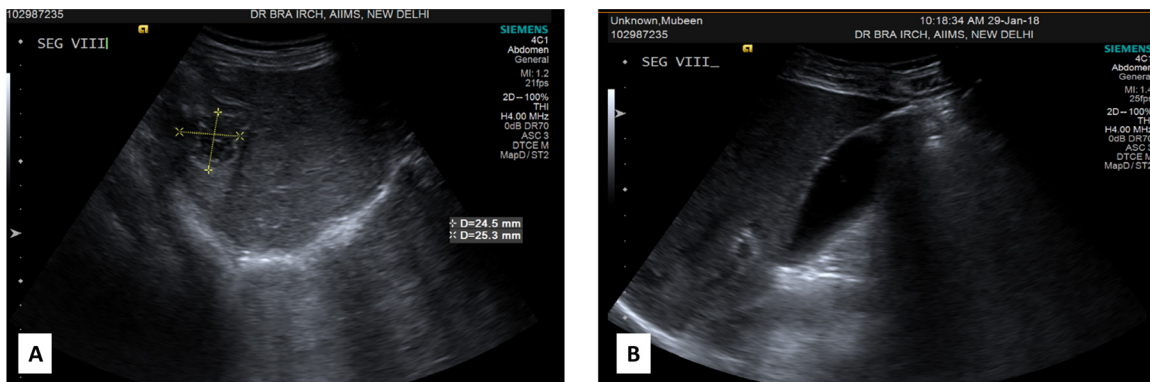


Figure 2. (A) A 2.5cm X 2.4cm hypoechoic lesion in liver segment VIII indicating residual disease, (B) GB without any mass lesion.

3. Discussion

Worldwide annual incidence of cystic echinococcosis has been estimated to be around 100,000-300,000 new cases. Increased prevalence of this disease is found in Mediterranean countries (between 1-8/100,000), Middle east, Africa (> 3%), Australia, South America and New Zealand. However, due to widespread international migration and global travel, the disease is increasing in incidence throughout the world (3). Hydatid disease is endemic in India and a major health concern, which adds to economic burden of the country. The annual incidence varies from 1-200/100,000 in different parts of the country. It has highest prevalence in Andhra Pradesh and Tamil Nadu (17).

The life cycle of *Echinococcus* species involves two hosts and a free-living egg stage. It is principally maintained in a dog-sheep-dog cycle, yet several other domestic animals may be involved. The adult *E. granulosus* resides in the small bowel of the definitive hosts *i.e.* dogs or other canines. A heavily infected dog alone can infect intermediate hosts like sheep over a wide area. The infection may be acquired by contact with infected dogs, egg-containing faces, egg-contaminated plants and soil usually happening by direct hand-to-mouth transfer. Eggs can also be ingested by consuming uncooked contaminated raw vegetables, salads, fruits and drinking water (3).

Sites: Once, egg reaches small intestine of man or intermediate host, oosphere gets released, which then, penetrates intestinal wall and enters into portal circulatory system ultimately reaching liver. Liver (65-75%) is the most common site of involvement followed by lungs (10-25%). All other sites of involvement are considered as unusual sites, which include peritoneal cavity (8-18%), spleen (2-3%), kidney (1-4%), uterus and adnexa (0.5-1%), retroperitoneum (0.5-1%), pancreas (0.5-08%), brain (2%), gall bladder (< 1%) and others. (0.1-3%) (5).

Most patients with atypical localizations produce symptoms at advanced stages. Radiological methods such as ultrasonography and computed tomography scan or magnetic resonance imaging may be confirmatory in most cases, while serological tests such as ELISA which have a sensitivity of > 90% serve as a useful ancillary diagnostic tool in cases with equivocal imaging (18).

GBHD is a very rare entity, even in areas where hydatid is endemic. It can primarily involve gall bladder only in rare occasions or secondary infestation may be seen by daughter cysts from pre-infected liver. The pathogenesis for GBHD is not very well understood and few hypotheses have been proposed. The most widely accepted route of infestation is through bile duct usually with co-existing primary liver involvement. Others routes include, spread of cyst through lymphatic channels after absorption of contaminated food into bowel, and gall bladder seeding done during any prior surgical

intervention of hepatic hydatid cyst (2).

Hydatid cyst has three layers *i.e.* outermost layer – pericyst – consists of modified fibrous and protective zone produced as host immune response. Middle layer is laminated, acellular membrane responsible for diffusion of nutrients and innermost is germinal layer, which contains scolices, which are larval stages of parasite. Together, middle and innermost layer are called an endocyst being the true layers of cyst, and outermost layer is referred to as pericyst. Infectious embryogenic tapeworms, develop from an out pouching of the germinal layer (19).

Pathological examination *via* FNAC or biopsy usually demonstrates different layers of cysts along with broad capsules and protoscolices. Occasionally, only hydatid sand along with hooklets may be found which are PAS and AFB positive.

Radiologically, Hydatid cyst is classified into 4 types. Type I includes active and initial stage of hydatid cyst, Type II also includes active phase of the parasite which can spread to adjoining areas by an out-pouching of a new cyst from main cyst cavity. Type III includes dead/inactive cyst and Type IV complicated cysts (20). USG also categorize cysts as solitary univesicular, solitary multivesicular, solid echogenic mass, multiple, either uni or multi-vesicular, or collapsed, flattened, and calcified. Additionally, USG can also identify active stage of disease where routine X-Ray may come out as normal. CT gives a clearer picture with respect to number of cysts, size, site, architecture and their relationship to adjoining areas. Many studies have demonstrated higher sensitivity of CT compared to USG for diagnosis (21). However, MRI is the diagnostic modality of choice for atypical Hydatid like muscular or subcutaneous because of its better assessment of soft tissue structure and its relationship (22).

Serological tests supplement radiological data in diagnosis of hydatid cyst. The gold standard serology test for echinococcosis detects IgG antibodies to hydatid cyst fluid-derived native or recombinant antigen B subunits. This is performed using ELISA or immunoblot formats and have high sensitivity (> 95%) but lower specificity (22).

The differential diagnosis of a cystic mass anywhere in the body includes a spectrum of congenital, traumatic, infective, benign and malignant etiologies. A liver or gall bladder cyst could be a simple (bile duct) cyst, Carolis disease, polycystic liver disease, benign adenoma, focal nodular hyperplasia, metastatic lesion, biliary cystadenoma or cystadenocarcinoma, primary hepatoma, pyogenic or amoebic abscess, and echinococcal cyst.

Complications like rupture can occur and can be contained (internal), communicating, and direct. The pericyst remains intact in internal rupture and may occur due to degeneration, trauma or response to therapy. Direct rupture occurs when both endocyst and pericyst rupture and can cause widespread dissemination into the

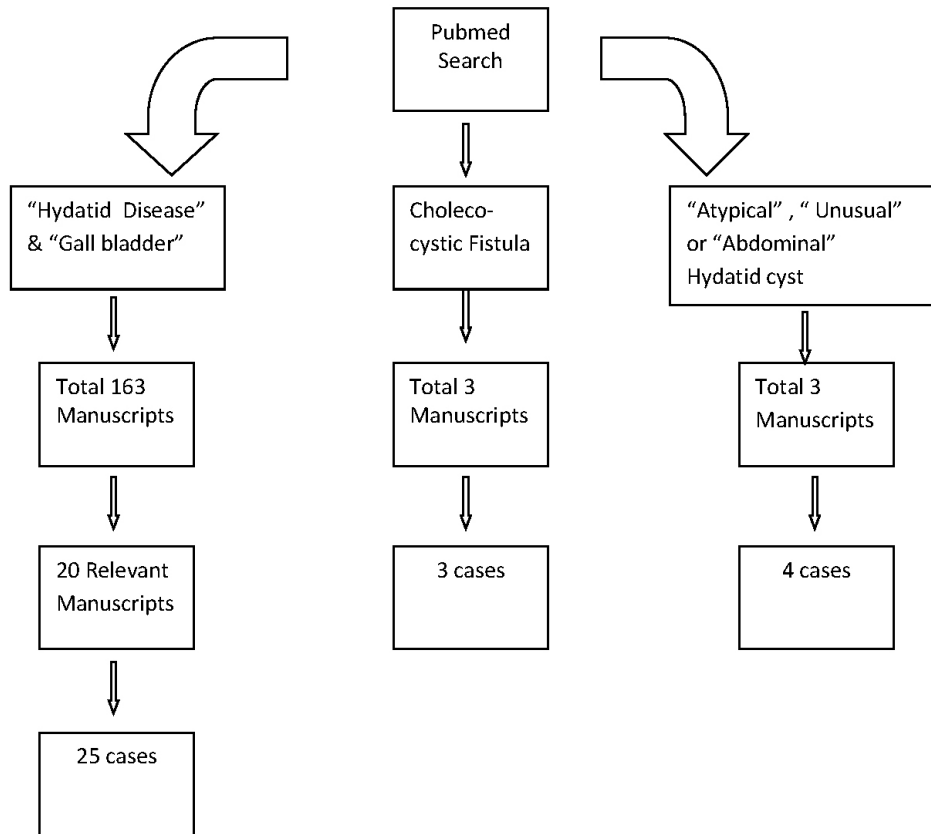


Figure 3. Flowchart depicting search of literature for "hydatid cyst of gall bladder".

peritoneal cavity. Iatrogenic rupture can also occur *via* surgical or percutaneous treatment and sudden death; anaphylactic shock or dissemination of disease can occur if cystic content spills into the peritoneal cavity.

Management of liver hydatid cysts includes medical therapy, percutaneous drainage or surgery. Various studies (21) demonstrated that Albendazole therapy and surgery combined have cure rates of > 90% and lower recurrence rates.

Mechanism of action of Albendazole is that it binds to colchicine-sensitive site of β -tubulin and inhibits their polymerization into microtubules in the intestinal cells of the parasites subsequently decreasing their absorptive function, especially the uptake of glucose by the adult and larval forms of the parasites, and also depleting glycogen storage. Depleted glucose levels result in insufficient energy for ATP production leading to the eventual death of the parasite. Albendazole sulfoxide (the active metabolite of Albendazole) is 70% bound to plasma protein and is widely distributed throughout the body; with active levels detected in urine, bile, liver, cyst wall, cyst fluid, and cerebrospinal fluid (CSF). Biliary concentrations of Albendazole sulfoxide have been found to be similar to those achieved in plasma because biliary elimination forms a significant proportion of elimination of Albendazole from the circulatory system (23).

The cure rate of medical management is around 60% and its indications are where there are contraindications

such as complex or widespread injury, advanced patient age, pregnancy, co-morbidities, multiple cysts which are difficult to access, partially inactive or calcified liver cysts, or patient refusal of surgery.

Surgical options include conservative surgeries like partial cyst resection, removal of cyst content followed by sterilization of residual cavity and PAIR (percutaneous aspiration and reinstallation of normal saline). Though conservative surgery is safer and less complex, however, they are associated with higher recurrence and morbidity rates. Complicated cysts, which are very close to biliary channels are best treated with conservative procedures to avoid risk of biliary leaks. Radical surgery includes pericystectomy and involved liver resection and comes with risks of compromising liver function. There is high risk of spillage of cyst contents leading to anaphylaxis with/without peritoneal seeding.

Extensive literature review was done on PubMed for listing previously reported cases of hydatid cyst of gall bladder. Mesh terms such as gall bladder, hydatid cyst, choleco-cystic fistula, atypical hydatid, unusual hydatid were used and a total of 169 manuscripts were screened. Subsequently, articles were enlisted, which pertained to GBHD as selection algorithm mentioned in flowchart (Figure 3). A total of 32GBHD cases, which included both primary (only GB) and secondary (involving GB and Liver) were analyzed (2,5-16). The discussed case will be the 33rd case in continuation with already

Table 1. Case reports with clinical data

Authors (Ref.)	No. of Cases	Year	Primary /Secondary	Age /Sex	Clinical Data	Abdominal Examination	Biochemical Results	Radiology	GB stones /Cholecystitis	Serology	Management		Recurrence
											Surgical	Medical	
BarónUrbaNo <i>et al.</i> (2)	1	1978	Secondary	76	1	4	Normal	NA	NA	NA	Cholecystectomy + Total cyst resection	None	NA
Rigas <i>et al.</i> (2)	1	1979	Primary	65/F	1,2	None	NA	CT	No	Not done	Cholecystectomy	None	No
Cangiotti <i>et al.</i> (2)	1	1994	Secondary	M	NA	NA	NA	NA	NA	NA	Cholecystectomy	None	NA
Kappor <i>et al.</i> (2)	1	2000	Primary	53/M	1,3,4	1,3	Deranged LFT	USG	No	Positive	ERCP + Stent	None	No
Raza <i>et al.</i> (2)	1	2003	Secondary	27/M	1,4	4	NA	USG	YES	Not done	Cholecystectomy + Rt. Lobe enucleation	None	NA
Kumar <i>et al.</i> (2)	1	2004	Secondary	27/F	1,6	None	NA	CT	No	Not done	Partial pericystectomy + Cholecystectomy; percutaneous aspiration, instillation and re-aspiration hypertonic saline	post operative albendazole x 4 months	No
Safioleas <i>et al.</i> (2)	1	2004	Primary	65/F	1,2	None	Normal	X- Rays, Barium Meal &Cholangiography	YES	Not done	Cholecystectomy + total cyst resection	None	No
Safioleas <i>et al.</i> (2)	2	2004	Primary	51/F	1	None	Eosinophilia & Normal LFT	X- Rays, Barium Meal, USG	YES	Not done	Cholecystectomy + total cyst resection	None	No
Safioleas <i>et al.</i> (2)	3	2004	Primary	63/M	1,5	None	Normal	X- Rays, CT	YES	Positive	Cholecystectomy + total cyst resection	None	No
Pitiakoudis <i>et al.</i> (2)	1	2005	Primary	60/M	1,2,3,4	3	Deranged LFT	USG , Spiral CT, MRI	YES	Not done	Cholecystectomy	post operative albendazole x 4 months	No
Wani <i>et al.</i> (2)	1	2006	Primary	51/F	1	None	NA	USG,CT	YES	Not done	Cholecystectomy	None	No
Sabat <i>et al.</i> (2)	1	2008	Secondary	35/F	1,3,4	2	Deranged LFT	USG,CT	No	Not done	Cholecystectomy + percutaneous aspiration, instillation and re-aspiration using hypertonic saline (segment VII)	post operative albendazole x 9 months	No
Murtaza <i>et al.</i> (2)	1	2008	Secondary	32/F	1,5	4	Normal	USG	None	Not done	sub-total Cholecystectomy	preoperative albendazole	NA
Krasniqui <i>et al.</i> (2)	1	2010	Primary	39/F	1,2	2	Normal	USG, CT , X- Ray Abdomen and Chest	None	Not done	Pericystectomy & Cholecystectomy	post operative albendazole (3 cycles 21 days each with gap of 1 week)	No
Rabbani <i>et al.</i> (16)	1	2011	Secondary	38/M	1,2,3,4	4	Eosinophilia & Normal LFT	USG & Chest X-Ray	No	Not done	Pericystectomy & Cholecystectomy	post operative albendazole (3 cycles 21 days each with gap of 1 week)	No
Mushtaque <i>et al.</i> (7)	1	2012	Secondary	NA	1,5	1	NA	USG & CECT	NA	Positive	Cholecystectomy	post operative albendazole (2 cycles 21 days each with gap of 14 days)	No
Ertem <i>et al.</i> (2)	1	2012	Primary	42/M	1,2,3,4	1	Deranged LFT	USG, CT, MRCP, ERCP	No	Positive	Cholecystectomy	None	NA
Noomene <i>et al.</i> (2)	1	2013	Primary	32/F	1,2	2	Normal	USG, CT, MRI	No	NEGATIVE	Cholecystectomy	None	No
Yücesoy <i>et al.</i> (2)	1	2014	Secondary	58/M	1,2,3,4	1	Deranged LFT	USG & MRCP	No	Not done	Cholechohomy & Cholechoduodenostomy	post operative albendazole x 2 weeks	No
Index Case	1	2018	Secondary	60/M	1,2,3	None	Normal	USG & CT	No	Positive	Pericystectomy & Cholecystectomy	post operative albendazole	No

Clinical data: - abdominal pain 1, nausea & vomiting 2, fever -3, jaundice -4, dyspepsia- 5, past history of hydatid-6. Examination: -hypochondrium lump-1, abdominal tenderness -2, ascites-3, hepatomegaly -4

Table 2. Case reports without clinical data

Authors (Ref.)	No. Of cases	Year	Primary/Secondary	Language
Seror <i>et al.</i> (15)	1	1958	Secondary	French
Khokhlov <i>et al.</i> (14)	1	1962	Primary	Russian
Ansimov <i>et al.</i> (13)	1	1962	Primary	Russian
Tkebuchava <i>et al.</i> (11)	1	1966	Primary	Other
Khokhlov <i>et al.</i> (12)	1	1967	Primary	Russian
Gillet <i>et al.</i> (10)	3	1973	Secondary	French
Mizaushv <i>et al.</i> (9)	1	1979	Primary	Russian
Ivanis <i>et al.</i> (8)	1	1994	Secondary	German
Aksu <i>et al.</i> (6)	3	2013	Primary	Other

reported cases.

Out of all reported cases (Tables 1 and 2), 18 cases (56.3%) were primary and the other 14 were secondary. Detailed clinical data was available in 19 cases (Table 1) whereas it could not be extracted in the other 13 cases (Table 2) as they were published in indigenous languages with only the abstract available in English. We hereby, analyzed clinical, management and outcome profile for 19 cases along with the indexed case.

Among these, abdominal pain was most common presenting symptoms seen in 19/19 (100%) cases. Nausea/vomiting 8/19 (42.2%) and jaundice 8/19 (42.2%) were ranked as the second most common symptom. The index case also presented with nausea, vomiting and abdominal pain. Out of all the cases studied only a single case (5.3%) had prior history of hydatidosis. This patient had lung hydatidosis 2 years back and later presented with GB hydatidosis. However, the index case did not have previous such history. Abdominal examination was normal in 6/19 (31.6%) whereas 4/19 (21.1%) patients had mild hepatomegaly. Abdominal tenderness and ascites was seen in 3/19 (15.8%). Six cases 6/19 (31.6%) had associated gallstones. Liver function was deranged in 5/19 (26.3%) while it was normal in 7/19 (36.8%) cases similar to the index case.

Alone or in combination, USG, CT, and MRI were used to confirm diagnosis of GBHD with variable frequency in different cases. MRCP and ERCP were also used as a part of workup in 2/19 (10.5%) cases. Hydatid serology was used as a part of workup in 6 cases with a high positive rate in 5/6 (83.3%) cases. Index case also demonstrated positive serology results.

As a part of medical treatment 7/19 (36.8%) received post-operative Albendazole. Only a single case (5.3%) received pre-operative Albendazole. Our case has received only medical treatment and has dissented from surgical intervention. 11/19 cases (57.9%) cases did receive various anti helminthic therapies as a part of treatment. Cases were followed up for a minimum period of 5 years and none of the cases reported recurrence on follow-up. GBHD either primary or secondary has never been reported to be associated with hepatobiliary malignancy.

The current case was an adult male presenting with a

long standing history of abdomen pain. Gall bladder lump along with lesions in liver were discovered on imaging. The history of anorexia and weight loss coupled with the imaging findings put the differential of gall bladder carcinoma as the most probable diagnosis. GBHD as has been discussed is a rare entity and is not among the top differentials thought of in a GB lump. This case teaches us the importance of keeping infective etiologies such as hydatid cyst in mind while investigating a lump as Hydatid cyst, which has been reported from rare sites such as peritoneal cavity, spleen, kidney, uterus, adnexa, pancreas, brain, etc.

4. Conclusion

Despite the available advances medical and surgical management, the prevalence is still high for hydatid disease especially in endemic regions. This is a completely treatable and preventable disease. It calls for promotion of healthcare and hygiene awareness among rural masses along with health care providers about disease. Good hygiene and ideal quality assurance of slaughter houses, equipping healthcare professionals and health centers for timely diagnosis and treatment is mandatory for eradication of this disease.

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